1872MNRAS..32..238S

The Solar Eclipse of December 12th, 1871.
By Mr. Tebbutt.

The delicate state of my health prevented me from joining the expedition for observing the total eclipse at Cape Sidmouth; but I availed myself of the instrumental appliances at Windsor, for the observation of the partial phase. It unfortunately happened that the evening of the 11th was cloudy, so that no observations could then be taken for the determination of the mean time at the Observatory. The following morning, however, broke clear and fine, and I succeeded some hours after sunrise in observing the transits of two stars of the first magnitude. These observations in connexion with others taken in the evenings of the same and the following day, served for the determination of the chronometer errors and rate. A strong N.W. wind prevailed throughout the day of the eclipse, and broken clouds passed rapidly across the sky during the forenoon. With the exception of two or three small fleecy clouds, which passed almost instantaneously over the disc, and that without appreciably obscuring it, the Sun was bright and unclouded throughout the phenomenon. There were several spots on the Sun, but they were not of a very remarkable character. A group of small spots was to be seen on the eastern limb, involved in an immense tract of faculæ. The first contact appeared to take place at $2^h\ 18^m\ 39^s\!\cdot\!1$, owing, however, to a momentary removal of the eye from the telescope, this phase of the eclipse must have been observed somewhat late, probably to the extent of two or three seconds. The Sun's limb was remarkably steady and sharply defined. A very small sun-spot was observed to disappear at the Moon's edge, at $2^h\ 40^m\ 44^s\!\cdot\!5$, and at $2^h\ 57^m$, the same spot was again seen immediately after it had emerged from the Moon's limb. The most conspicuous spot on the disc was bisected by the Moon's limb at $3^h\ 28^m\ 41^s\!\cdot\!9$. Up to $3^h\ 30^m$, the images were very steady, and the cusps sharply defined; there being no rounding-off of the latter at the extreme points. At this time, however, the Sun's limb began to boil, which disturbance increased rapidly at $3^h\ 36^m$. The large conspicuous spot was again bisected at $3^h\ 37^m\ 24^s\!\cdot\!4$, while emerging from the Moon's limb. At $3^h\ 43^m$, the limb approached very near to the large tract of faculæ, but did not pass over it. During the early progress of the eclipse, the mountain-peaks and ranges along the edge of the Moon were beautifully distinct against the solar background. I believe I never before saw them to such advantage. Towards the end of the eclipse the images became more steady. The last contact took place at $4^h\ 4^m\ 38^s\!\cdot\!3$. The most interesting circumstance perhaps in connexion with the eclipse was the effect which the phenomenon had on the vacuum solar thermometer, suspended freely in the Sun's rays. From the beginning of the eclipse the thermometer gradually sank till about the time of greatest obscuration, when it began to rise, and continued to do so till the end of the phenomenon. The

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instrument then, owing to the decreasing altitude of the Sun, began to fall again.

As the readings of the thermometer may prove interesting, I subjoin them:—

Readings of the Solar Thermometer during the Eclipse, December 12th, 1871.

Mean Time.	Therm.	Mean Time.	Therm.	Mean Time.	Therm.	Mean Time.	Therm.
h m s	deg.	h m s	deg.	h m s	deg.	h m s	deg.
2 22 25	114·8	3 5 25	107·4	3 46 40	109·5	4 18 10	112·1
2 24 55	114·3	3 8 55	107·0	3 49 55	110·0	4 19 55	111·8
2 32 25	113·6	3 12 25	106·3	3 52 55	110·5	4 22 25	111·1
2 36 25	112·6	3 15 55	106·1	3 55 40	111·0	4 24 55	111·0
2 41 55	111·5	3 19 55	106·0	3 59 55	111·8	4 27 25	110·4
2 44 55	111·1	3 22 55	106·1	4 2 25	112·8	4 29 55	109·7
2 48 55	110·5	3 25 55	106·3	4 5 55	113·5	4 32 25	109·2
2 52 55	109·6	3 29 55	106·6	4 9 25	113·3	4 34 55	109·0
2 55 25	109·0	3 33 55	107·3	4 11 55	113·0	4 50 55	107·0
3 0 25	107·7	3 39 55	108·7	4 13 55	112·9	5 27 25	103·8
3 3 25	107·2	3 43 40	109·0	4 15 55	112·5	6 16 25	93·0

On the Aurora of February 4. By H. P. Finlayson.

As it is probable that some members of the Royal Astronomical Society saw the Aurora Borealis of the evening of Sunday last, Feb. 4th, I am anxious to record its appearance as seen here; for, should the display have been similar to an observer at some considerable distance from Dover, it may be possible thereby to obtain some faint idea at what height such an electric storm takes place. The fore part of the evening was cloudy, and no stars visible; the clouds close to the Earth seemed vapoury, or large foggy clouds, and were reflecting a blood-red colour, as from some great conflagration. One could not tell how this red light was obtained, for above them there appeared to be one large cloud that covered the whole of the sky, thus preventing the stars being seen between the openings of the lower clouds. This led me to think that the cause of this red light must be very close to the Earth, on a level with or just above the lower clouds. This, however, cannot be correct, since the phenomenon was seen in Paris and Constantinople.

Between 10 and 11 the sky was quite clear of clouds, and then the Aurora Borealis was seen in perfection,—rays of light in every direction, and all radiating from one point in the heavens. At one time there were so many streamers, and the radiation so complete, that the point of departure was pretty accurately

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